April 8, 1961

VOL. 79, NO. 14 PAGES 209-224

SCIENCE NEWS LETTER

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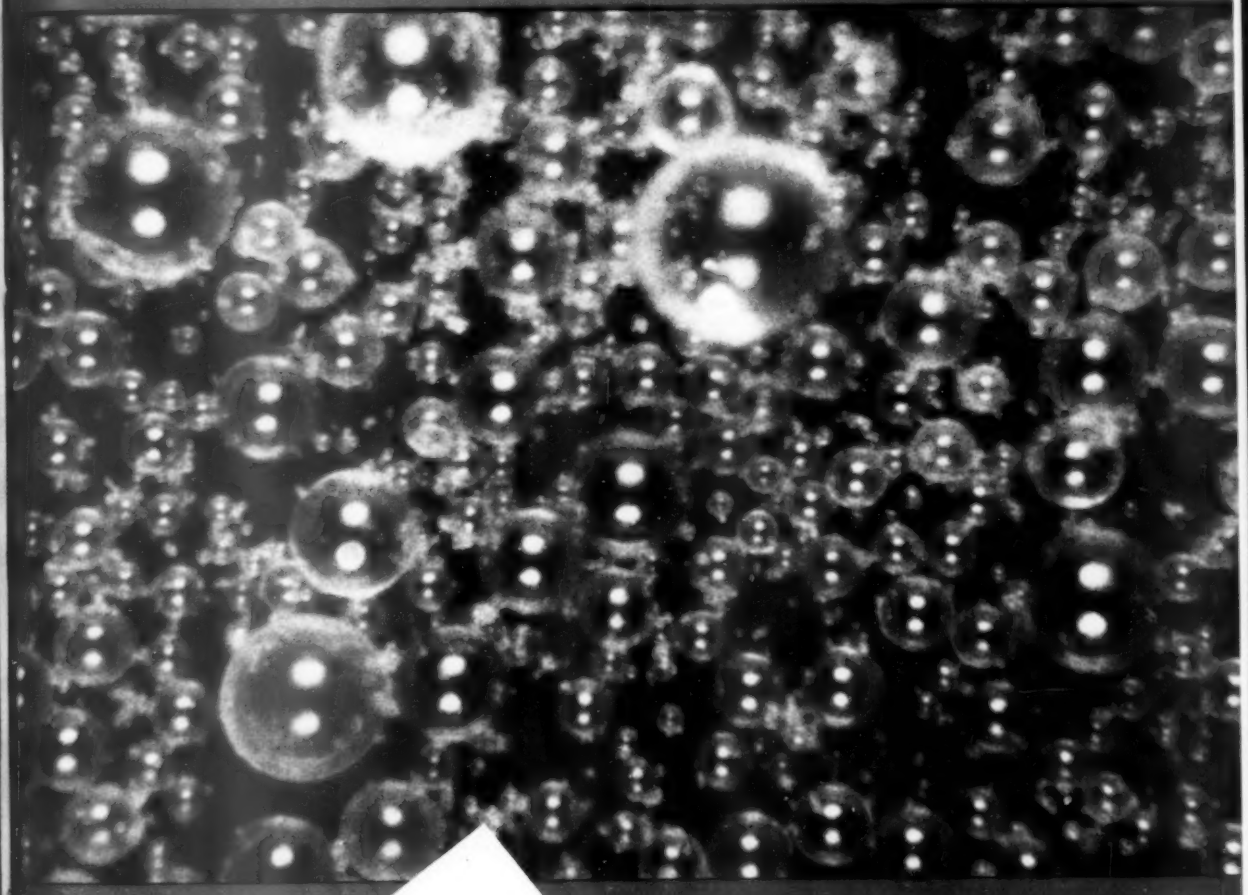
THE WEEKLY SUMMARY OF CURRENT SCIENCE



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Glass Microballoons

See Page 211

A SCIENCE SERVICE PUBLICATION

Kodak reports on:

useful pictures this big · . . . how to overcome boredom with polyethylene . . . faster, prettier Kodachrome II

Multum in parvo

Smaller than this. Oh, much smaller.

Smaller even than this.

In fact, in this small an area it is becoming possible today to construct useful apparatus of considerable complexity.

It is done by photography. The apparatus is drawn to a convenient scale. The drawing is photographically reproduced in the requisite microscopic size. The tiny photograph of the drawing of the apparatus is converted by various techniques to the apparatus itself. This is the principle.

The details take a bit of doing. So bright are the prospects of reward for working them out that many are applying themselves to the effort with much vigor and encouraging success. An understanding of a few optical and photographic fundamentals of microphotography helps. For a brief summary of these fundamentals, write Eastman Kodak Company, Special Sensitized Products Division, Rochester 4, N. Y. No specific directions for getting rich or famous are supplied.

Colloquy on floor polish

One man's poison is another man's meat, the millstone around one man's neck becomes the keystone in another's arch. Take floor polish. There must be quite a few chemists who have worked, slept, and eaten floor polish for so long that they know all there is to be known about it and feel trapped by the subject in a boredom of unplumbed depth.

Then along come you, fresh-faced and full of fun and optimism. What, you ask, do they put in floor polish? *Polyethylene.*

Have they always put in polyethylene? *No.*

Would it be fair to state then that, seen from the long vista of floor-polish history, one currently finds oneself safely over the threshold into the polyethylene era? *Yeah.*

Does this differ from the familiar polyethylene? How? *Through molecular weight frequency distribution, degree of branching, and percentage of hydrogens oxidized to hydroxyls, you pick your density, hardness, viscosity-temperature behavior, and emulsifiability.*

How is emulsification effected in water of a solid like polyethylene? *With emulsifiers. Most floor polishes have used anionic emulsifiers like oleic acid-morpholine. Hard to keep them light in color. Amine-type cationic emulsifiers have also been studied. But the non-ionics look the most promising. And that goes, too, for polyethylene emulsions used to modify the finishing resins for wash-and-wear cotton goods. Restore strength to the cotton and improve its sewability.*

See here. If you find this so all-fired fascinating, that could mean you see a commercial angle. It could become vital for us to get to know you better right away. If only you would disclose your name, address, and interest in the topic to Eastman Chemical Products, Inc., Kingsport, Tenn. (Subsidiary of Eastman Kodak Company), a kit of information on our Epolene *polyethylenes and their emulsification will become the initial token of our common intellectual interests.*

Piteous

Rumors you may have heard that there is an improved *Kodachrome Film* are true.

Kodachrome Film has been on the market for 25 years. It has been a smashing success. Braggarts are odious, but facts must be faced. *Kodachrome Film* has been a smashing success for 25 years. Nobody needs to be told any more that it yields excellent color movies and slides. The user is reminded that exposure index is 10 for Daylight Type, 16 for the indoor Type A, and enough said.

Why tamper with a winner? Well, progress must not be denied, even though with a product as big as *Kodachrome* progress presents its logistic problems. Now, in the 25th year of *Kodachrome*, we can raise the Daylight Type index to 25 (and the Type A to 40).

There is a temptation to devise an ad slogan around the conjunction of 25's but to resist this temptation is not difficult. Indeed, the far greater difficulties of the logistic problem compel us to direct the advertising of *Kodachrome II Film* largely to the likes of you, who read such magazines as this one.

You can quickly grasp the implications of the fact that despite the increase of speed, there has been improvement in sharpness and graininess characteristics, not sacrifice as one would expect. Furthermore, bright colors are brighter, pastels cleaner, contrast lessened to cover a wider subject-brightness range. With the "bright sunlight" setting for 8mm movies reduced from *f*/8 to midway between *f*/11 and *f*/16, you have more depth of field. On a "cloudy bright" day you can use *f*/8 and be in focus as close as 3½ feet without a close-up attachment over your regular 13mm lens. Indoors, with only two reflector flood lamps at the camera and an *f*/1.9 setting, you will be able to move farther back than before—as far as 20 feet.

Alas, the logistics. You grasp the implications but you wear no mark on your brow that entitles you to *Kodachrome II Film* if the dealer has just sold his last roll to your less scientifically inclined neighbor. Pity the dealer trying to deal fairly with the probably insufficient quantity of *Kodachrome II* that is currently reaching him. Pity us trying to fill those long, long pipelines with *Kodachrome II Film* while also keeping *Kodachrome I* flowing through the same pipelines without turbulence. Pity us trying to do this with a product which has to go through a production line twice—and be retained in the purchaser's possession for an uncontrolled period of time in between. Pity us.

Kodak
TRADE MARK

This is another advertisement where Eastman Kodak Company probes at random for mutual interests and occasionally a little revenue from those whose work has something to do with science

BIOCHEMISTRY

Blood Cholesterol Lowered

Two drugs that lower cholesterol up to 15%, a new use of algae in space ships and microballoons for lighter plastics were reported to the American Chemical Society.

➤ BLOOD CHOLESTEROL has been lowered appreciably in human beings by two new drugs, scientists were told at the American Chemical Society meeting in St. Louis.

The drugs, which are chemical relatives of hormones produced by the thyroid gland, lowered blood cholesterol levels by as much as 15% when given in small doses, Dr. Charles Duncan of the University of Louisville School of Medicine said. Many scientists believe that high levels of cholesterol in the blood are connected with atherosclerosis, a cause of heart attacks and strokes.

The drugs were prepared in an attempt to reduce the side effects that often accompany the use of the natural thyroid hormones, Dr. Duncan told a symposium on lipocholesteremic agents (factors controlling fat and cholesterol levels in the blood).

"Except in patients with deficient thyroid function, the use of the natural thyroid hormone to lower blood cholesterol has been limited by other effects, particularly the increase in work load imposed on the heart.

If the cholesterol lowering effect could be separated from the other effects of the thyroid hormones, they would become valuable tools in research on atherosclerosis and potentially useful in prevention or treatment of this very common disease," Dr. Duncan said.

Cholesterol level in the blood is useful in indicating the likelihood of coronary artery disease, Dr. David Kritchevsky of the Wistar Institute, Philadelphia, told the symposium. There is, however, no rigid proof that reduction of serum cholesterol levels in man will decrease the incidence of the disease, he said.

The only true test would be a large-scale experiment with human beings that would apply one method for safely lowering serum cholesterol levels and test its effects on new cases of heart disease, Dr. Kritchevsky suggested.

Three synthetic compounds that have shown laboratory effectiveness against the build-up of cholesterol were reported by Dr. William L. Holmes of the Smith, Kline and French Laboratories, Philadelphia. Due to undesirable side effects, however, the agents cannot be used as therapeutic agents, Dr. Holmes said.

• Science News Letter, 79:211 April 8, 1961

Algae for Space

➤ A METHOD for using algae in space vehicles was reported at the American Chemical Society meeting in St. Louis.

Algae are green plants. They use light energy to convert carbon dioxide into oxygen and the protein needed for animal life in the chemical process called photosynthesis. Algae may therefore be used to support life in a space vehicle.

Dr. Arnold C. Frederickson of the University of Minnesota said the carbon dioxide demand of algae would be supplied by animal respiration, so that the space vehicle could be a self-supporting unit.

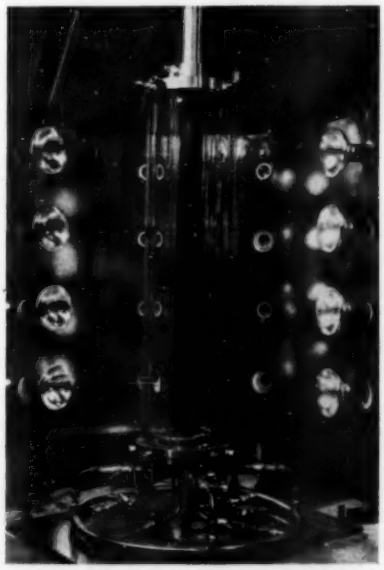
When the light energy is not used by a culture of algae, it rejects the energy as heat. The power supply of the system then has to be partly wasted in cooling, Dr. Frederickson said.

Since a space vehicle must carry either its own source of power or devices for collecting solar energy, low-energy utilization by an algae system increases the weight of the non-propulsive parts of the vehicle.

In most present algae culture systems the distribution of light does not allow the plant to make efficient use of the energy, Dr. Frederickson said. Near the surface, the light intensity is too high, and in the center the intensity is low.

Dr. Frederickson has developed a method to agitate the culture. This exposes all the cells of the culture to a more or less uniform intensity of illumination, he said.

Calculations show that it is possible to speed up the photosynthetic reactions by agitation, but that agitation will not increase the efficiency of energy utilization as much as desired.



GROWING ALGAE—Glass cylinder for growing algae is cooled by refrigerated ferrous sulfate solution circulated through a space outside the algae chamber to reduce heat from lamps.

"The predicted increase in efficiency is large enough, however, so that further research on the problem is indicated," Dr. Frederickson concluded.

• Science News Letter, 79:211 April 8, 1961

Microballoons for Plastics

See Front Cover

➤ TINY, HOLLOW SPHERES of glass are making plastics lighter, more rigid and less flammable, scientists were told at the American Chemical Society meeting in St. Louis.

The colorless glass particles, seen on the cover of this week's SCIENCE NEWS LETTER, are about two one-thousandths of an inch in diameter and weigh about one-third as much as water, H. E. Alford of the Standard Oil Company (Ohio) said. They are made by a high-temperature fusion process, he said. They remain unchanged up to temperatures of about 1,200 degrees Fahrenheit in reinforced plastics, such as those used in boat hulls or auto bodies. The hollow spheres give 30% stronger moldings at weight savings of 20% to 50%.

Articles with unique electrical properties can be produced when these low density hollow spheres are combined with a wide variety of plastics. These are finding considerable use in aircraft electronic parts, such as radomes and high frequency radio transmission, he said.

The glass microballoon particles, as they are called, also have fairly good thermal insulating properties and may have some application in acoustical installations.

"Much less dense articles are possible with this product than with any other type of filler material available today," Mr. Alford said. However, he noted, they do not solve all the problems for plastic fillers, since they will not work in applications where high pressures are involved.

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Anti-Cancer Chemical

➤ ONE TYPE of tumor in mice has been inhibited by 90% to 100%, using a new organic compound containing nitrogen. It has not yet been tried on human beings.

Dr. John A. Carbon, Sandra M. Brehm and James D. Ratajczyk of the Abbott Laboratories, North Chicago, Ill., have found the piperazine derivative (A-20968) effective against carcinoma 755, a transplantable mouse tumor. It also shows activity against two common types of cancer, sarcoma 180 and leukemia 1210, he reported to the American Chemical Society meeting in St. Louis.

The new compound is modeled after a compound called A-8103, which is undergoing clinical tests at the present. Both of these compounds appear to be examples of the anti-tumor agents known as "alkylating agents," although they represent an entirely new type of chemical structure among the anti-cancer drugs.

The organic chemist will be able to synthesize many closely related compounds by varying the "acyl side-chain" in the structure. Further evaluation is planned.

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BIOCHEMISTRY

Blood Enzyme Fingerprints

➤ DISEASES of the heart, liver and other body organs may be detected by a study of the enzyme "fingerprints" of the blood.

One of the enzymes found in the blood, lactic dehydrogenase (LDH), regulates several important chemical processes in the body, Dr. Kenneth F. Gregory of Ontario Agricultural College, Guelph, Ont., Canada, reported to the American Chemical Society meeting in St. Louis.

Dr. Gregory worked with Dr. Felix Wroblewski of the Sloan-Kettering Institute for Cancer Research, New York.

Whenever a body organ is damaged by disease, its enzymes are released into the blood stream. Each body organ has its distinctive mixture of the five forms (isoenzymes) of LDH. The LDH isoenzyme in the blood serves to identify the damaged organ in much the same way fingerprints identify persons.

Since the isoenzymes of LDH differ markedly in their resistance to heat, the amount of enzyme destroyed by heating at different temperatures is used to identify the mixture. A large amount of LDH destroyed by heating the blood serum at a relatively low temperature indicates liver disease. If a large amount of the LDH is not destroyed by heating at a relatively high temperature, heart damage is indicated.

The multiple nature of LDH is expected to be of value in the study of evolution and genetic relationships. Only one of the isoenzymes of LDH is reported to be present in birds; two in fish, amphibia, and reptiles; and up to five in mammals.

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Chemicals Used in Drugs

➤ CHEMICALS that hold, move or remove metals in the body are now being used in medicine, scientists were told at the American Chemical Society meeting in St. Louis.

Some metals are essential for the normal functioning of animal and plant tissues, Dr. Harold Hardman, Marquette University School of Medicine, Milwaukee, said.

Chemicals called chelating agents can combine with these metals. This ability can be used to benefit mankind, Dr. Hardman told a symposium on chelating agents in medicine.

Drugs that function as chelating agents can modify the activity of living cells when they combine with metals normally present in living organisms, Dr. Hardman said. One possibility is the removal of essential metals with a resulting change in growth and metabolism. This type of action may account for the anti-bacterial action of certain antibiotics.

Metals such as mercury and lead are not essential and may be harmful to animal tissues. They also can be combined and removed from the body by chelating agents.

High concentrations of a metal in a particular organ or tissue can be removed by chelating agents, Dr. Hardman said. Wilson's disease is characterized by unusually high concentrations of copper in liver and brain. The disease can be considerably modified by chelating agents that remove copper from the involved organs.

These agents may also be used to transfer heavy metals to an organism, for such ailments as iron deficiencies in plants or animals, Dr. Hardman said. The biological effect of a metal can be intensified when taken by the organism in the form of a chelate.

This appears to be a promising area for further research in the treatment of metal deficiencies in agriculture and medicine, Dr. Hardman concluded.

Chelating agents can also modify the effects of radiation, Dr. Jack Schubert of the Argonne National Laboratory, Lemont, Ill., reported.

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ASTRONOMY

Remake Venus "Weather"

➤ MAN CAN LAND on the mystery planet Venus after making its air suitable for humans. This job could be done by dropping primitive plants into the planet's atmosphere, then waiting for results.

The primitive algae would remove the carbon dioxide believed to poison the air on Venus for humans. The result would be carbon and oxygen.

Dr. Carl Sagan of the University of California, Berkeley, believes the best algae to drop on Venus are the blue-green algae (primarily of the Nostocaceae family).

He said many experiments on developing algae in a simulated atmosphere like that on Venus should be made. Such experiments would show which strain of these algae is better suited to live and reproduce in and to change the atmosphere of Venus.

The seeding of algae on Venus should only come after the existing conditions on Venus have been thoroughly investigated. Otherwise, unique scientific information about the planet might be lost, Dr. Sagan said.

The theories on the kind of "weather" Venus has are many and varied, but all are no more than educated guesses since the planet is covered by a cloud layer that hides its surface. The clouds were once thought to be formed only of dust, but water vapor has been found to be about as abundant as it is in the earth's atmosphere, Dr. Sagan reported.

Some scientists think the surface of Venus is dry while others believe it is covered with oceans of carbonated water.

The algae first dropped on Venus would live high in the air and use water deposited there in the form of water vapor or ice crystals.

As the carbon dioxide content of the atmosphere on Venus falls because of the algae, the surface temperature, now believed to be 600 degrees Fahrenheit, would begin to fall.

When the temperatures are low enough, the decreasing rate of algal decomposition would reduce the water abundance slightly, and the surface would cool below the boiling point of water, Dr. Sagan said.

At this point surface photosynthesis (by which plants produce food) would become possible. At somewhat lower temperatures rain would reach the surface. A balance would then be established in the atmosphere, and the carbon dioxide would be reduced to the level of earth, Dr. Sagan reported.

This would be the cue for the first manned space ship to land on the surface of Venus, Dr. Sagan said in Science, 133:849, 1961, publication of the American Association for the Advancement of Science.

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CHECKING FLIGHT AIDS—Navigational aids are checked for errors with SAFI (Semi Automatic Flight Inspection), a complex electronic system.

ROCKETS AND MISSILES

Fuel Cells for Satellites Developed by Air Force

➤ NEWLY DEVELOPED fuel cells for auxiliary power in orbiting satellites will soon be flight tested for performance, the Air Research and Development Command at Andrews Air Force Base, Md., reported.

The cells, which operate silently without noxious odors or parts to wear out, would be used to replace present satellite batteries, which run down in only a few weeks.

Each cell is composed of a membrane, or skin, on each side of which there is an electrode. Hydrogen gas is on one side of the membrane and a supply of oxygen is on the other.

Hydrogen and oxygen enter the chambers on opposite sides of the ion-permeable membrane and penetrate the porous electrodes to contact the surfaces of the membrane. The electrons are given up on the hydrogen side, collected in the electrode and conducted to the load. The hydrogen ions travel through the solid electrolyte to the other surface of the membrane and combine there with the returning electrons in the presence of oxygen. Electrolysis of the water back into hydrogen and oxygen makes this a regenerative fuel cell.

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AERONAUTICS

Plane Used to Correct Best Available Maps

➤ THE UNITED STATES now has a plane that "knows" where it is more precisely than the best available maps and shows how the maps should be corrected.

Primary function of the especially equipped Boeing 707 jet is to check navigational aids at high altitudes. It does this with a fast electronic system that records as it monitors. The records are later analyzed by a ground-based computer.

The system is so accurate that the plane's position with respect to the ground is known within 400 feet at all times. The stations are checked much faster and more accurately than by any previous method.

In a four-hour flight covering 1,466 air miles, the plane checked 35 ground stations from an altitude of 32,000 feet. Preliminary information indicated that there was radio interference between stations at Front Royal, Va., and Charleston, W. Va., although not enough to make a safety hazard.

The plane, which cost $2,600,000 and is considered a bargain, is operated by the Federal Aviation Agency, which must know how its guidance and other systems for pilot aid are working at high altitudes.

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DENTISTRY

May Transmit Tooth Decay

➤ MICROBES that store carbohydrates may cause tooth decay and transmit it from one person to another.

Preliminary research is underway at the Forsyth Dental Infirmary in Boston, based on a report from the National Institutes of Health, Bethesda, Md., that hamsters could transmit tooth decay.

Dr. Ronald J. Gibbons, research associate at Forsyth and the Harvard School of Dental Medicine, told the annual meeting of the International Association for Dental Research in Boston that he and his associates will work experimentally with hamsters from the NIH strain.

Dr. Gibbons said investigations suggest that certain microbes found on the surfaces of the teeth are able to store a portion of the sugar taken in while a person is eating.

"These microorganisms are then able to convert this stored carbohydrate into decay-producing acids during the period of time between meals," he reported.

A comparison of the bacteria present on tooth surfaces between patients with tooth decay and those free from decay showed almost twice as many bacteria capable of storing sugars in the patients with dental caries.

Dr. Gibbons and his group believe these carbohydrate-storing microbes are important to the study of tooth decay causes and may pass the caries from one individual to another. Working with Dr. Gibbons on the project are Drs. Sigmund S. Socransky and John B. Macdonald of Forsyth and Harvard.

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Cancer Cases Found

Fourteen unsuspected cases of cancer, discovered by a painless examination of the cells of tissue lining the mouth and upper throat, were reported to the International Association for Dental Research meeting in Boston by Dr. Henry C. Sandler, of the Veterans Administration Hospital, Brooklyn, N. Y.

Two of three persons affected by mouth cancer die of the disease within five years. However, the probability of curing early cancer is around 90%.

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MEDICINE

Tumor Immunity Sought

➤ TUMOR IMMUNITY, a long-sought aim in cancer research, is the ultimate goal of a study reported at the American Cancer Society's 1961 science writers' seminar in St. Petersburg, Fla.

Dr. Arthur E. Bogden of the Biochemical Research Foundation, Newark, Del., told the writers that his research group, by means of tumor extract, was trying "to stimulate natural defense mechanisms, so that the body will be induced to fight the spread of cancer within itself."

Autoimmunity has already been induced in noncancerous tissues, so the possibility of sensitizing an individual to his own cancerous tumors is gaining support.

Dr. Bogden and his associates worked with rats, ten percent of which could resist tumor implants.

"We found that we could determine in advance," the biochemist said, "whether a rat would be susceptible or resistant to an ascites tumor-implant, by first mixing some of its red blood cells with the serum from animals which had resisted a tumor-implant."

If the animal's red blood cells were clumped by the anti-serum, the investigators observed, it would die from an implant. But if they were not clumped, the rat would be capable of resisting the implant.

The studies indicate that the rat, as well as rat tumors, contain antigens that control the transplantation of both normal and cancerous tissues.

Dr. Lawrence Levine of Brandeis University, Waltham, Mass., reported studies with his associates that demonstrated the antigen-producing qualities of DNA, or deoxyribonucleic acid, the carrier of genetic information in cells and many viruses.

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GENERAL SCIENCE

Science Fair Awards

➤ FOUR ADDITIONAL national agencies are cooperating with the National Science Fair-International, conducted by SCIENCE SERVICE, to increase the recognition and opportunities that may be earned by finalists selected to attend the annual event.

At the 12th National Science Fair-International to be held in Kansas City, Mo., May 10-13, the American Heart Association will award a citation plaque and an all-expense trip to exhibit at the association's annual convention in Miami Beach in October.

The National Aeronautics and Space Administration will designate six students and their teachers to receive expense-paid trips to NASA research facilities where they will be guests for two days.

The Optical Society of America will award a citation plaque and $125 to a winner and a plaque and $75 to a runner-up.

A Pathologist-Medical Technologist award will be presented by the Inter-Society Committee for Pathology Information and the National Committee for Careers in Medical Technology. A certificate of merit and a summer job at the American Registry of Pathology of the Armed Forces Institute of Pathology in Washington, D. C., with travel expenses paid, will be awarded to one finalist.

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16 New Fairs Affiliated

➤ THE EFFECTIVENESS and wide appeal of the science fair movement is reflected in the continued growth of the National Science Fair-International which now includes 16 newly affiliated regional and area fairs, bringing the total to 205 fairs.

Each of these fairs may select two outstanding exhibitors to be sent as finalists to the 12th National Science Fair-International which will be conducted by SCIENCE SERVICE May 10-13 in Kansas City, Mo. The official party is expected to include well over 1,000 since fair directors, educators and news representatives will accompany the finalists.

Four science fairs from Oklahoma and two from Texas are among those who will participate for the first time in the international event.

The new affiliates also include one fair each from Colorado, Indiana, Kansas, Louisiana, Maryland, Nevada, New Jersey, New York, Virginia and Wisconsin.

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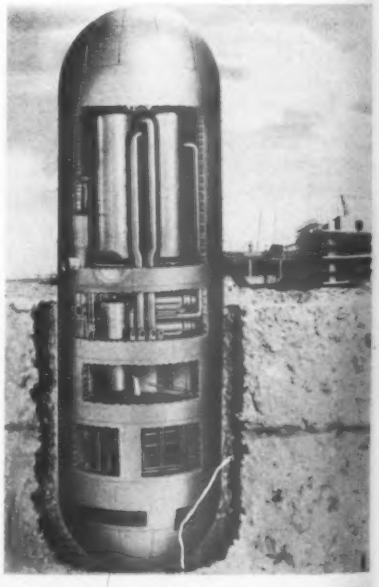
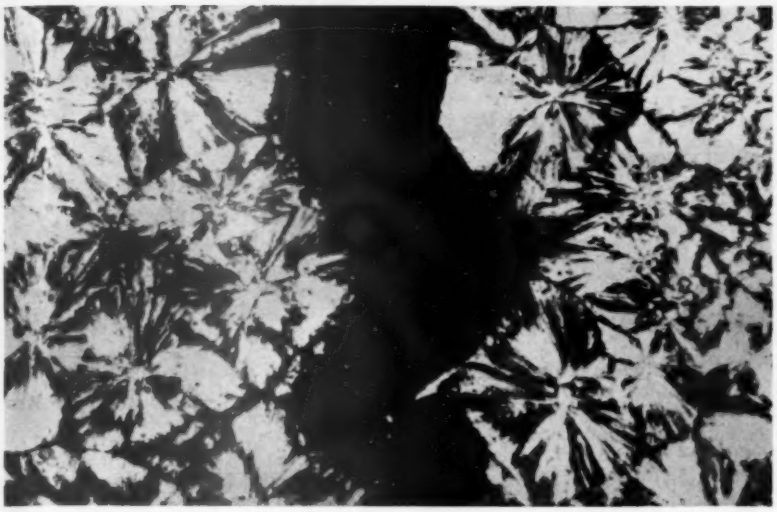


GERMAN ATOM PLANT—The first German atom power plant has been opened near Frankfort on the Main. The reactor as well as the action primary circuit is built into the cylinder.



CRACKING WIDE OPEN—Photomicrograph of polypropylene film shows break along the edge of spherulites (radial crystal growths in polymers) that occurred during rapid crystallization. This phenomenon was discovered by Fabric Research Laboratories, Inc., Dedham, Mass.

PSYCHIATRY

No Spirit of Belonging

➤ DESPITE the well known fact that juvenile delinquents like to run in gangs, one principal difficulty of the psychiatrist trying to help these boys by group therapy is that it is very hard to build up a spirit of belonging to the group.

The reason for this, Dr. Albert W. Silver, psychologist of the Wayne County Juvenile Court Clinic, Detroit, Mich., told the American Orthopsychiatric Association meeting in New York, seems to be that delinquents generalize their distrust of adults and hostility toward them to include those of their own age group.

Just as black leather jackets, long hair and jive talk are "trademark" carried by these young delinquents, the boys are enough alike in other ways so that a psychiatrist can generalize a little about them.

The young delinquent lives in the here and now. The delinquents would prefer to have the judge send them for a short sentence in an inferior, punitive institution rather than for a longer sentence in an institution that is superior in every other respect. The delinquent will steal, play hookey, or beat someone for immediate gain or to prevent a beating by other members of his gang. He does not give any thought to the long-range consequences.

The delinquent is enormously preoccupied with violence—his own violence, as when he beats alcoholics, or violence by teachers, policemen, institutional supervisors of whom he has been the victim. This preoccupation is close to the surface of his mind.

Far below the surface are feelings of terror, helplessness and anger experienced by those who have been tied and beaten by their own parents. Feelings are generally avoided and distrusted by delinquents. They seem to regard feeling as something soft and feminine.

In the main, they avoid any discussion of their parents.

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PSYCHIATRY

Special Classes Improve Disturbed Children

➤ EVERY emotionally disturbed child placed in special classes in Gary, Ind., showed improvement, a psychiatrist has reported.

All the pupils had at least average intelligence and were believed able to benefit from the special class teaching.

The first of three special classes for emotionally disturbed children in the Gary, Ind., Public Schools in collaboration with the Lake County Mental Health Clinic started in 1958. The schools wanted to separate disrupting or non-learning children from others and later return them to regular classes.

Dr. Jay L. Bisgyer, a Gary, Ind., psychiatrist, reported results of the program to the American Orthopsychiatric Association meeting in New York. Three of the children in special classes have been returned to regular classes and are reported doing well.

Younger children seem to respond faster and change more in the special classes than older children do, Dr. Bisgyer said. He said that if children with emotional problems are sent to a special class early, a year or two can change them enough so they can return to regular classes and progress normally with their classmates.

The teacher is the most important individual in the special class program. Although not a therapist, she exerts a powerful healing effect. A psychiatric evaluation of a teacher selected for such special classes must be thorough. If a suitable teacher cannot be found, "it is better to postpone establishing a class." Dr. Bisgyer said.

• Science News Letter, 79:215 April 8, 1961

TECHNOLOGY

Future Library Described

➤ BY 2000 A.D. the United States will have to have an automatized national library, Prof. John G. Kemeny of Dartmouth College, Hanover, N.H., has predicted.

Each page of each "book" in this library, he suggested, will be stored on possibly, a square millimeter of tape. The patrons will never go to the library, see the master tapes or find that a book is "out." Copies will be made for them to read, conveniently enlarged, on the screens of viewing devices in their own offices or homes.

Obtaining a copy of a book will be like making a long-distance call—a person will merely dial the appropriate code number and the book will be squirted into the viewing machine electronically. The reader will be able to keep the book on his tape as long as he wishes, then erase the tape and have another book flashed to him.

Prof. Kemeny's lecture was one of a series on "Management and the Computer of the Future" presented by the Massachusetts Institute of Technology School of Industrial Management, Cambridge, Mass., to celebrate the Institute's centennial.

Such a library will be needed, he said, because if the present rate of growth continues, even our richest universities will not be able to afford building, cataloguing and keeping up the kind of libraries they have now. Even though a national library might cost a billion dollars, he contended, it could prove more economical than continuance of the present system of storing information.

Moreover, Prof. Kemeny said, "there is no conceivable way in a libary of tens of millions of volumes that human effort could locate an item in a matter of minutes."

He envisions a library of 10,000,000 volumes in 2000 A.D. that will grow to possibly 300,000,000 volumes by 2100 A.D.

"Storage methods must miniaturize books and put them on a medium easily handled by machines," he said, because of this rate of growth.

• Science News Letter, 79:215 April 8, 1961

PSYCHOLOGY

Mature Sex Films Impress Old More Than Young

➤ MATURE SEX FILMS are likely to have greater influence on middle-aged adults than on younger adults.

Films having sexual content sometimes receive more response from older than younger adolescents and more from adults than from young children, Dr. Arthur J. Brodbeck of Mt. Sinai Hospital, Los Angeles, reports in Psychological Reports, 8:59, 1961.

Dr. Brodbeck also found that a film dealing with constant fear of death was felt more powerfully by mature persons than by younger adults. This, he states, is contrary to the generally accepted idea that impressions from movies are less when the viewer is older.

Dr. Brodbeck said experience from life may cause this greater involvement with films about death, especially fear of death. As persons grow older and others around them become ill and die, problems and thoughts about death become more important.

To test this hypothesis, a film, Wages of Fear, dealing with the danger of death among men driving trucks loaded with nitroglycerin, was shown. The individuals who found no reality in the film belonged to the youngest group, 20 to 29 years of age.

• Science News Letter, 79:216 April 8, 1961

TECHNOLOGY

Electronics to Speed Up Overseas Communication

➤ ELECTRONIC data-processing machines now will be directed to speeding up international commercial communications.

RCA will initiate this use for the first time by 1962, Thompson H. Mitchell, president of RCA Communications, Inc., has announced.

Government officials, both from the military and civilian branches, learned how the computer system will function at a special meeting with RCA representatives in Washington, D. C.

A special data processor that will occupy 3,850 square feet will be fed information in code. It is equipped to handle messages from any channel of communication including transmission from satellites. The processor has the "brains" to identify from the code the type of message sent, the country of origin and its ultimate destination. It is then capable of sending the message by normal transmission channels to its destination.

The machine will have its own built-in inspector or check-up operation to assure accuracy. It also will have a duplicate standby in the event of any technical malfunction.

It operates in microseconds, far faster than presently used transmitting equipment; but it has the intelligence to accommodate its pace to the speed of wire or radio messages.

Jobs will not be lost because of this newest development in automation in communications, Mr. Mitchell said. "Labor-saving devices cut down operating costs, permit a reduction of rates and an improvement in service for the public. The resulting expansion may mean more jobs rather than fewer ones."

RCA handled 25,000 international messages daily in 1960, as contrasted to 1,000 a day in 1920.

• Science News Letter, 79:216 April 8, 1961

MEDICINE

Recovery After Coma And Heart Stoppage

➤ A RARE CASE of recovery of a two-and-a-half-year-old boy who was unconcious for two weeks after his heart stopped beating at least five minutes is reported in the Journal of the American Medical Association, 175:1102, 1961.

The child, previously healthy, had been hospitalized because of severe bronchitis. When he became worse and was unable to clear the secretions in his throat in spite of medications, he had an operation to open his windpipe (tracheotomy).

Two days after the operation, the circulation collapsed. However, before the physicians could perform a heart massage, the circulation improved.

Treatment included lowering the child's body temperature to 94 degrees Fahrenheit, giving sedation and bringing about cerebral decongestion.

The boy remained in the hospital for 36 days, during which time he acted as though he was learning all things anew. The physicians reported that he was like an infant and was "taught to hold, to grasp, to sit, and similar activities, which he gradually learned over a period of time."

Drs. Max S. Sadove, M. Kemal Yon, Paul H. Hollinger, Kenneth S. Johnston and Frederick L. Phillips of the University of Illinois Research and Educational Hosiptals in Chicago are reporting the case.

• Science News Letter, 79:216 April 8, 1961

MEDICINE

Syphilis Cases Estimated At More Than a Million

➤ THE NUMBER of syphilis cases in the United States is estimated to be as high as 1,200,000, Dr. William J. Brown, chief, venereal disease branch of the Public Health Service's Communicable Disease Center, Atlanta, said.

"This tremendous reservoir of cases," he reported, "can be lessened by treating more cases than are being added." This is currently being done by blood testing large chunks of the population, such as premarital and prenatal groups, those in hospitals, military selectees and those who are released from the armed forces.

Dr. Brown said 120,249 cases of syphilis were reported to the Public Health Service in the year ending June 30, 1960. Many additional cases were treated but not reported, mostly by private physicians. Penicillin is the usual treatment.

• Science News Letter, 79:216 April 8, 1961

IN SCIENCE

METEOROLOGY

Tornado Damage Studied With Paper Models

➤ A LABORATORY study of "paper tornadoes" could possibly cut down the high loss of life and homes in a tornado's path. Scientists at the U. S. Army Electronic Proving Ground, Fort Huachuca, Ariz., are building tornado models that could unlock the secrets of the tornado funnel.

By comparing damage patterns of tornadoes that whipped through certain areas with the models, the weathermen hope to determine building standards that would withstand the tornado's fury.

Ninety different tornado models were built for the study, George W. Reynolds told the American Meteorological Society in Chicago.

• Science News Letter, 79:216 April 8, 1961

PUBLIC HEALTH

Human Brain Explored In Cooperative Research

➤ HOPE FOR TREATMENT of numerous brain-centered diseases is seen in the pooling of research by a committee of 13 voluntary health organizations.

One in every 16 babies born in the United States suffers from some disorder of the nervous system, and millions of other Americans are victims of neurological and sensory ailments.

Dr. A. B. Baker of the University Hospital, University of Minnesota, Minneapolis, is chairman of the cooperating group that makes up the National Committee for Research in Neurological Disorders.

In a booklet, Exploring the Brain of Man, published by the committee, Dr. Baker said that the united effort being made by voluntary health groups holds promise for the future.

"The war on the widely varying disorders of man's brain," Dr. Baker states, "is a vast medical frontier which is rapidly becoming one of the most important research areas in the field of medicine and public health."

A group of voluntary associations and professional societies was instrumental in the creation by Congress of the National Institute of Neurological Diseases and Blindness of the National Institutes of Health in 1950.

This agency now has 285 trainees in clinical neurology in 60 training programs.

A publication of the new committee tells in laymen's language the latest technique and research findings for treating strokes, epilepsy, cerebral palsy, mental retardation, multiple sclerosis and other demyelinating diseases, myasthenia gravis, muscular dystrophy, Parkinson's disease, and disorders of vision, speech and hearing.

• Science News Letter, 79:216 April 8, 1961

E FIELDS

MEDICINE

Ceylon University Study Shows Hazards of Boxing

➤ DISORDERED ACTIVITY of brain waves appeared in E.E.G. (electroencephalograph) records of 30 out of 50 Ceylonese boxers studied at the University of Ceylon in Colombo, three researchers report in the British Medical Journal, March 25, 1961.

The scientists state they had previously noticed definite changes in work attitudes among the university boxers.

Some of the best boxers of Ceylon were included in the study. Among the 50 were university, police and armed forces men, along with some of high school age. Some of the boxers had represented Ceylon in the Olympics or other meetings held abroad.

Seventeen, or 34%, gave a history of at least one knockout, while six, or 12%, complained of persistent headaches. Eleven, or 22%, showed loss or impairment of memory.

A comparison, or control, group of 75 university students, who had taken part in other sports but not in boxing, showed only six cases, or eight percent, with abnormal brain wave activity when given E.E.G. examinations.

The investigators said the presence of disordered activity among 60% of the boxers is statistically very significant. They also noted that only 34% had ever been knocked out.

Drs. M. S. Nesarajah, K. N. Seneviratne and R. S. Watson of the University of Ceylon report the study, which was made with apparatus from the Rockefeller Foundation, New York. At last year's annual British Medical Association meeting, a motion asked the Government to declare boxing illegal.

• Science News Letter, 79:217 April 8, 1961

ROCKETS AND MISSILES

New Frontier in Space Provides Financial Boost

➤ PRESIDENT KENNEDY'S "New Frontier" in United States space research provides a financial boost for larger space rockets sooner.

After a "careful review of the U. S. position in space technology," President Kennedy has asked Congress for an increase of $125,670,000 over the Eisenhower budget of $1,109,000,000 (or 11.3%) for the National Aeronautics and Space Administration. James E. Webb, NASA Administrator, said the extra funds are intended "to speed up booster and propulsion components for both manned and unmanned space flight."

The money will make it possible to accelerate by more than a year the launch of Saturn, a liquid-fuel powered space vehicle capable of carrying 19,000 pounds in an earth orbit.

C-2, a stepped up version of Saturn, capable of putting 19,000 to 45,000 pounds into a 300-mile orbit, also will be advanced by the budget increase, Mr. Webb said. It should make its flight in 1966 instead of 1967 as previously scheduled. The Saturn C-2 also is planned for a manned orbit around the moon and a probable soft landing on the moon.

No additional money was requested for research and development of solid-fuel rockets, despite growing belief among Congressmen that building large solid-fuel boosters would more quickly close the gap in booster capability between the U. S. and the USSR. More than $99,000,000 is allocated to the liquid-fuel rockets Saturn and Centaur and the facilities required, compared with $3,100,000 for research and development in solid-fuel rockets.

The decision to concentrate funds and effort on the liquid fuel vehicles was the President's, SCIENCE SERVICE learned.

In Congressional testimony, one NASA official suggested that $15,000,000 might be spent by the space agency for solid-fuel research and development.

Dr. Hugh Dryden, Deputy Administrator of NASA, said that solid propellants are used in the upper stages "of almost every flight we make." He said that funds for solid-propellant research were not larger because the U. S. is not yet ready for development of larger solid-fuel boosters.

• Science News Letter, 79:217 April 8, 1961

OCEANOGAPHY

Ocean Studied for Atomic Waste Disposal

➤ THE ATOMIC Energy Commission has awarded Columbia University's Lamont Geological Observatory a contract to study ocean waters to determine the effect of atomic waste disposal in the oceans.

The research, scheduled to begin this summer in the North Atlantic near Bermuda, will include studying ocean movements by dropping a common red dye into the ocean at selected sites.

Water will be sampled at various ocean depths by a ship towing a sensitive device that can record as little as two parts of dye to 100 billion parts of water. The device will also contain other instruments for measuring the temperature and depth of the ocean water sampled.

Until the actual mixing, spreading and circulation rates of specific ocean areas are known, no reasonable control over atomic waste disposal in the ocean can be expected, Dr. Maurice Ewing, director of the Observatory and the project, said.

Although the research will cover a small portion of the Atlantic Ocean, the AEC hopes the program can eventually be extended to cover major ocean areas.

The research by the Observatory will be financed by a $290,000 grant from the AEC. Another contract, involving $200,000, was awarded by AEC to the Systems Engineering Division of Pneumo-Dynamics Corporation of Washington, D. C., for developing and testing the equipment to be used in the study.

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ROCKETS AND MISSILES

Foreign Cooperation In U. S. Space Research

➤ UNITED STATES space research is developing a French accent.

The French Committee for Space Research (Comite des Recherches Spatiales) will prepare space experiments to be launched in sounding rockets by the National Aeronautics and Space Administration.

A memorandum of understanding between the two organizations also calls for the Comite to design experiments for satellites to be launched by NASA, technical exchanges of equipment and personnel, and training of French space science technicians at NASA science centers.

France also has joined with England to provide ground stations for NASA's communication satellites, Projects Relay and Rebound, to be launched during 1962 and 1963.

The stations will be equipped with advanced radio facilities for conducting tests with active and passive satellites at high frequencies and low power.

Project Relay, scheduled for launch in 1962, is NASA's low altitude active repeater satellite. The space craft will weigh less than 100 pounds and will contain instruments to detect radiation damage and other effects of space environment as well as communication experiments.

Rebound follows Echo, NASA's first passive reflector communication satellite. Under this project, rigid inflated spheres (like Echo) will be placed in orbit in 1963 using a single launch vehicle.

The three cooperating countries will welcome participation by other countries willing to provide additional ground facilities for the experiments.

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ROCKETS AND MISSILES

Space Communication With "Gas" Antennas

➤ SPACESHIPS of the future might communicate with each other by using the exhaust gases fired from rockets as radio antennas.

Ionized exhaust gases are good electrical conductors and can be used to send out and receive messages from other spaceships, Barry Mindes of the International Telephone and Telegraph Corporation Federal Laboratories of Nutley, N. J., reported.

A whole new frequency range for intraspace communication would open up without increasing the weight of space vehicles, Mr. Mindes told the Institute of Radio Engineers International Convention in New York. The long exhaust trail in the sky would act as an antenna for communicating in lower frequency radio bands, which until now have not been used because they require a huge antenna.

The proposal crystallized from a study sponsored by the U. S. Office of Naval Research.

• Science News Letter, 79:217 April 8, 1961

ASTROPHYSICS

Mutual Aid in Space

United States space goals are being advanced by a "mutual aid" research program, an experiment in international cooperation, launched by NASA, Lillian Levy reports.

➤ FUTURE UNITED STATES satellites and rockets streaking through space will be products of the skill and knowledge of scientists from many nations.

The high-flying vehicles will offer dramatic proof of the success of an experimental "mutual aid" research program launched by the National Aeronautics and Space Administration. This is the unique "research associateships" project of Goddard Space Flight Center theoretical division, NASA's major "think" plant.

Under this program several distinguished foreign scientists have contributed to NASA's highly complex and original space research.

They are among the "research associates" recipients of special NASA fellowships for scientists of postdoctoral rank, who work in the theoretical division under the direction of Dr. Robert Jastrow, 35-year-old specialist in physics of the upper atmosphere.

The appointments are available to U. S. scientists as well as those from abroad, but the majority have been given to foreign scientists. The associates represent a variety of countries: Japan, Italy, Denmark, China, India, New Zealand, Great Britain, Germany, and the United States. They represent, as well, a variety of scientific disciplines, astrophysics, ionosphere physics, seismology, and cosmic radiation.

Designing Space Experiments

This is in keeping with the character of the division which includes geophysicists, astronomers, celestial mechanicians and physicists working "for the first time as a team in space research," Dr. Jastrow told SCIENCE SERVICE.

The division is responsible for designing space experiments aimed at unlocking the secrets of the universe and revealing its origin. Experiments and research are concerned with the structure of the earth, the composition of the atmosphere of the earth and of other planets, the role of the moon and other bodies in the solar system, and the evolution and structure of the stars.

The "aid" provided by the associateship appointments to this broad research has been substantial. "The program has made as great a contribution as any other single element toward the success of the theoretical division," Dr. Jastrow said.

A major contribution, for example, was made by Dr. Bengt Stromgren, senior research associate from Denmark, who initiated special research in theoretical astrophysics. Now at the Institute for Advanced Study at Princeton, Dr. Stromgren undertook a study with division scientists on convective zones in stars that have a mass about the same as the sun. The zones occur at certain levels within the stars where energy is transferred by mass movements, as when steam rises from a boiling kettle, rather than by direct radiation.

Associate Dr. Hong-Yee Chiu of the Republic of China, an exceptionally talented theorist, did astrophysical research on supernovae, the exploding stars believed to represent the final stages of stellar evolution. Stars are believed born of stellar dust and supernova stars ultimately in explosion return to dust.

The calculations of Dr. C. Hayashi of Japan on the evolution of more massive stars "will improve our measurements of the ages of the stars," Dr. Jastrow said. This special research on stars by the associates is an important part of the search for the answers to how the world began.

Dr. N. Fukushima, Japanese physicist, is making a valuable contribution by the collection and analysis of geomagnetic data and their cross correlation to latitude and longitude dependence of geomagnetic effects.

Dr. Norman F. Ness, a U. S. associate from the University of California, Los Angeles, is involved in the analysis of magnetometer data. Such analysis will provide more accurate mapping of the magnitude and direction of the earth's magnetic field. This, combined with the research by Dr. Fukushima, will help pinpoint exact sources of energies in solar terrestrial relationships.

Dr. Ness has a "down-to-earth" approach to space research. His analysis of seismic data of the Chilean quake of May 22, 1960, and the identification of periods of free vibrations of the earth from these data has yielded important information on the earth's inner structure. These studies have important implications in space, since seismic measurements of the moon made from a future lunar space probe may be compared with these to determine accurately the internal structure of the moon.

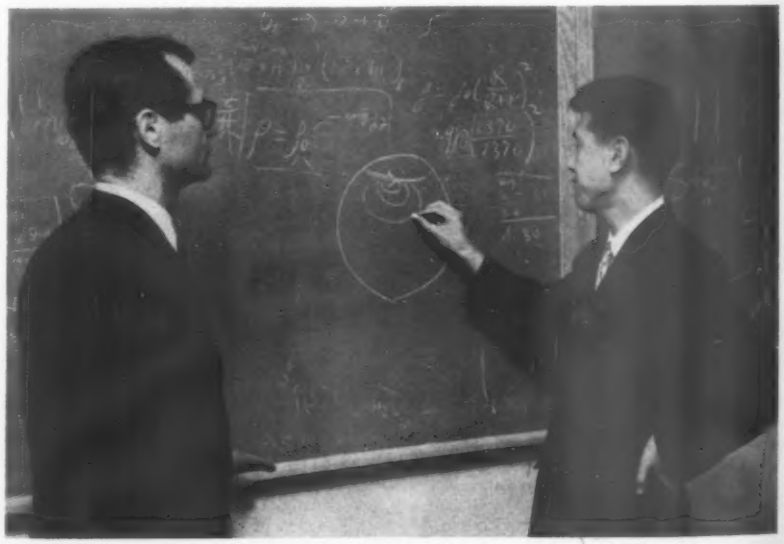
Dr. Harold C. Urey, Nobelist and senior associate at the University of California, La Jolla, has suggested that the moon's surface holds cosmic matter that may reveal the story of how the earth and the solar system were formed. Dr. Urey's ideas are credited with having profoundly affected the thinking of the division on the importance of lunar exploration.

Develops View of Aurora

Dr. Daniele D. Cattani, research associate from Italy, has developed a very interesting view of aurora (northern lights) in terms of electric discharge phenomena that possibly would involve the Van Allen radiation belts, and may bring new light to solar-earth relationships.

Participation in the NASA program thus far has been only by scientists from Western-bloc nations. However, at the request of President John F. Kennedy, a study has been made to determine areas in which the U. S. and the USSR may join in exploration of space for peaceful uses and benefit.

Meanwhile, NASA intends to continue to promote international programs in space



SPACE WISE MEN.—Dr. Robert Jastrow, chief of NASA's theoretical division, checks with "research associate" Dr. N. Fukushima of Japan on calculations of geomagnetic data.

for all nations eager to share in the pioneering efforts in this vast new frontier.

In addition to the international cooperation through its program of research associateships, NASA has provided technological assistance to the rocket and satellite programs in England, France, Japan, Norway, Sweden, Argentina, Italy and Canada.

In fact, one Canadian program utilizes the facilities of the common launching site at Ft. Churchill, where one-third of NASA's own sounding rockets are launched.

Sounding rockets are used to take readings in the earth's atmosphere that may yield information about weather. Frequently, such scientific rockets are launched into the ionosphere to obtain readings that will increase knowledge related to communication.

Italy successfully launched its first sounding rocket in Sardinia in January, 1961, a project which NASA fostered.

Currently, the United States and the United Kingdom are working on a joint satellite project.

Many of the nations receiving technical and material help from NASA have reciprocated by being hosts to NASA's tracking and communications stations overseas. Almost a dozen countries have these stations, many of which are operated by technicians of the host countries. In some instances, the operating costs are defrayed by the country. NASA also has made many of the stations available for scientific use by the country in which they are located as operating schedules permit.

Recent participation of many countries in weather observations synchronized with Tiros II was of practical benefit, particularly to the Australian Weather Service. By means of information from Tiros and its own observers, it was able to forecast and prepare for weather in advance, with considerable financial benefit.

Reciprocity or "mutual aid" is essential to the health of any cooperative effort, whether it be in outer space or in health, education and welfare. The amount of aid that may be exchanged is not as significant as the willingness to share.

Currently, the Administration is attempting to promote reciprocal exchange agreements in space with the Soviet Union "that will contribute to some useful purpose."

President John F. Kennedy has pledged that "we are going to continue to attempt to engage the Soviet Union in a common effort of that kind of (useful space) activity."

Such an agreement will satisfy a major goal of NASA—that space be utilized by all men for the common good.

• Science News Letter, 79:218 April 8, 1961

MEDICINE

Muscular Dystrophy Test

➤ MUSCULAR DYSTROPHY can now be detected long before the physical symptoms have apeared by an increase in enzymes in a person's blood serum.

The new test makes it possible to trace development of muscular dystrophy for the first time from its very early stages. It was reported from the University of California, Los Angeles Medical School by Dr. Carl M. Pearson in collaboration with Drs. S. R. Chowdhury, W. M. Fowler and W. H. Griffith.

"Since there is no known cure for the disease, early detection will not help us to treat the disease any better," Dr Pearson noted. "But this broadening, step-by-step concept of the disorder may eventually lead to improved methods of treatment and even prevention of it."

In studies of families with a history of muscular dystrophy, elevation of serum enzymes was detected in a number of normal appearing children under three years of age. The youngest was only four months old.

Studies of biopsied muscle tissue revealed that changes in muscle of these children had already occurred although physical symptoms had not as yet appeared. Physical symptoms of musclar weakness have since appeared in some of the children.

These studies have suggested the following steps in development of the disorder: 1. occurrence of a biochemical defect in muscle cells, probably genetic in origin; 2. increased permeability of muscle-cell membrane, causing enzymes to leak out of muscle tissue and into the blood; 3. accumulation of excess biochemical products, leading to early breakdown of muscle; 4. regeneration of muscle fibers which is quantitatively insufficient to keep up with breakdown process; 5. replacement of damaged areas by fat and connective tissue; 6. appearance of clinical muscular weakness (the stage when the disorder is usually diagnosed and biopsied); and 7. advanced muscular weakness.

The disease may in some cases actually begin in the prenatal period, Dr. Pearson said.

• Science News Letter, 79:219 April 8, 1961

GENERAL SCIENCE

U. S. Research Boon To Economic Growth

➤ UNITED STATES research and development is one of the most effective spurs to continual economic growth, statistics reported by the National Science Foundation, Washington, D. C., show.

About $12.4 billion was spent on research and development in 1959, which accounted for 2.6% of the gross national product (GNP). During the past few years, this ratio has continually stayed above 2%, the Foundation reported.

New products absorbed into the economy continually stimulate U. S. investment and output. Such products as transistors show that certain research and development efforts result in much greater returns than in investments for plants and equipment. In 1959, funds for research and development represented about one-tenth of the total U.S. investment.

The report is available from the U. S. Government Printing Office, Washington 25, D. C., for ten cents.

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ADVENTURES WITH THE MISSING LINK—Raymond A. Dart with Dennis Craig—*Viking,* 255 p., illus., paper, $1.65. Reprint of first-hand account of the discovery of the fossil man-apes in South Africa, first published in 1959.

THE ALGEBRA OF PROBABLE INFERENCE—Richard T. COX—*Johns Hopkins Press,* 114 p., $5. Essays on the probability, entropy and expectation of probable inference.

THE AMERICAN BUFFALO—Wanda Lynn Pearson—*Steck,* 30 p., illus. by Betty Cobb, $1.75. For young readers.

ANIMAL BAGGAGE — George F. Mason — *Morrow,* 94 p., illus. by author, $2.50. About animals that carry materials, their young or their food.

BALLOONS FLY HIGH: 200 Years of Adventure and Science—Lynn and Gray Pook—*Whittlesey House,* 72 p., illus. by Richard Bergere, $2.75. History of ballooning told for young readers.

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THE BIOCHEMISTRY OF MUCOPOLYSACCHARIDES OF CONNECTIVE TISSUE—F. Clark and J. K. Grant, Eds.—*Cambridge Univ. Press,* 125 p., $4.75. Biochemical Society Symposium, held in London, February 1960.

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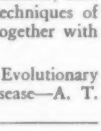

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INVENTION

Patents of the Week

A developer for color film and a previewer of motion picture negatives, have been patented. A device for safer dental X-rays was another recent invention.

▶ TWO PHOTOGRAPHIC DEVICES just patented could be a boon among do-it-yourself amateur photographers and also help the motion picture industry.

One is a portable automatic film developer for home camera buffs; the other is an "electronic previewer" for developing motion picture films.

Hardy Iwao Tsuno of Gardena, Calif., has invented a film developer, patent No. 2,975,695, that processes color film without any human assistance. The film is inserted in a machine, which is set for the time required by the film manufacturer to develop the film. The film is automatically washed and then dunked in chemical solutions that develop the film. The developing unit can be used at home on the kitchen sink or table and is easily stored in a small closet, the inventor claims.

The "electronic previewer," patent No. 2,976,348, was invented by William F. Bailey of Valley Stream, Bernard D. Loughlin of Huntington, and Charles E. Page of Westbury, N. Y., and assigned to Hazeltine Research, Inc., Chicago.

A screen image of what a motion picture negative will look like in color permits photo-developers to make any necessary adjustments before a final print is made. needless time and expense in the present "trial-and-error" method of print-making are saved by the method, the patent claims.

The image is "shot" on the screen by electron guns that excite differently colored phosphors embedded in the display screen.

Safer and more comfortable teeth X-rays by a dentist is claimed by inventor Stephan T. Freeman of Gloversville, N. Y., who was awarded patent No. 2,976,417. A bridge, placed behind the teeth, guides a tiny container housing two spools of X-ray film. As each picture is snapped, the film is wound from one spool onto the other, exposing new film. The bombarding X-rays pass through a small opening in the container, recording the tooth's image on the film. The container traps the dangerous rays, and no tooth is exposed twice to the radiation, Mr. Freeman states in his patent.

A radar antenna with a huge reflector, nestled in a hillside for collecting radio waves, is visualized by Winfield W. Salisbury of Lafayette, Calif., who assigned his patent, No. 2,976,533, to Zenith Radio Corporation of Delaware. The radar unit spots small objects, such as airplanes, at greater distances than other radar units because the huge apron-like reflector scoops up more radio waves and reflects them into the sensitive antenna. A lens at the focal point of the reflector corrects any stray reflected radio waves that would miss the antenna.

A "switchboard" that allows handicapped people to make telephone calls with little effort won patent No. 2,976,370 for Edward T. Duncan, of Bridgeport, Conn., who assigned it to Harvey Hubbel, Inc., also from Bridgeport. By merely flipping a switch, a person can tap into a telephone line or dial a number. A series of numbered electric lights on the switchboard corresponding with the numbers of a standard telephone dialing system tells the person the number he is dialing.

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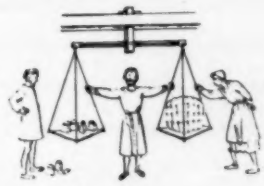

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MEDICINE

Dragnet for Special Blood Pressure Victims

➤ VICTIMS of a difficult-to-diagnose high blood pressure disease, but surgically curable in most cases when properly diagnosed, are being sought in a nation-wide "dragnet."

Command post for the medical man hunt is the University of California, Los Angeles, Medical School, with Dr. Morton Maxwell as project director. Some 19 other institutions, including the Los Angeles Veterans Administration Center, Harvard, Michigan, Northwestern and Tulane universities, are participating in the study, which is supported by the U. S. Public Health Service.

The problem is to distinguish between the potentially curable type of high blood pressure and the incurable kind.

The curable form is associated with impaired blood supply to one or both kidneys and is known as renovascular hypertension. It can frequently be cured by surgical correction of a narrowed artery leading to the kidney or removal of the diseased kidney itself.

The other type of high blood pressure is essential hypertension, a more widespread form. Its cause is unknown, and there is no known cure, although it may be controlled by blood pressure-lowering drugs.

Several new tests, including X-ray procedures and radioactive kidney function tests, have been developed in recent years to aid in diagnosis and selection of patients who would benefit from surgery.

Results of such tests and other information will be collected by participating institutions from a large number of patients. These data will be statistically analyzed and critically evaluated at UCLA.

Preliminary studies performed at UCLA and elsewhere have demonstrated that a 72% or higher "cure rate" is possible among the "kidney hypertension" patients. With improved screening methods for the disease, most of this group of patients may be identified and surgically cured.

• Science News Letter, 79:222 April 8, 1961

Questions

DENISTRY—What is the probability of curing early mouth cancer? p. 214.

GENERAL SCIENCE—When will the 12th National Science Fair-International be held in Kansas City, Mo.? p. 214.

MEDICINE—How large a percentage of boxers tested in Ceylon had suffered loss or impairment of memory? p. 217.

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New Ideas and Gadgets

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SLIDE PROJECTOR with wireless remote control uses ultrasonic or silent sound to focus and change slides. Transmitters on remote control unit are operated by two buttons and permit speaker to illustrate lecture while moving about room without call of "next slide please." It can be operated from distances of more than 40 feet.

• Science News Letter, 79:224 April 8, 1961

AUTO LIGHT KIT provides emergency protection from the hazards of auto light failure while driving. Three miniature lamps in a plastic case can be used for prompt replacement of stoplight, taillight, signal or parking light burnouts. Available in both 6-volt and 12-volt lamp sizes, the kit fits into glove compartment.

• Science News Letter, 79:224 April 8, 1961

TUFT-DYED RUGS in well-defined multi-colored patterns now are available both in cut and loop pile by a new single operation method. The number of colors in individual patterns ranges from four to six, and patented method allows unlimited scope in design.

• Science News Letter, 79:224 April 8, 1961

CAKE STAND, shown in the photograph, is a two-piece set which when reversed separates into a divided relish tray

and center vase. The set is made of milk glass with a carved leaf and floral design.

• Science News Letter, 79:224 April 8, 1961

CLASSROOM RECORD BOOK makes attendance taking and daily grading simple and easy. The book, designed by a teacher, consists of pages providing space for six classes. Each page has eight rows of pockets up and down, representing rows of classroom seats. Student prints required data on his card and cards are placed in pockets partially exposed, allowing easy check.

• Science News Letter, 79:224 April 8, 1961

STARTING PLATFORMS for swimming meets are available in sets of eight colors to match score cards of timers and judges. The hollow, warp-proof, rot-proof plastic platforms can be stacked for easy storage and can be fitted to any pool deck contour with simple hand tools.

• Science News Letter, 79:224 April 8, 1961

SLIDE RULE KIT lets the "do-it-yourselfer" construct his own special slide rule for recurring calculations connected with his special work. Kit contains parts for making three basic slide rules as well as many variations, a plastic scale plotting ruler, a universal logarithmic chart and instructions.

• Science News Letter, 79:224 April 8, 1961

LAWN MARKER made from heavy gauge steel with white baked enamel finish adds polite note to green lawn. It says "please" instead of "don't" or "keep-off." Marker stands 12 inches high and can be placed anywhere.

• Science News Letter, 79:224 April 8, 1961

Nature Ramblings

➤ EARLIEST OF ALL the commoner woodland plants is the hepatica. It sends forth its delicate white or bluish flowers from among the tough, winter-purpled leaves of the previous season's growth, while the bite of frost is still in the air, and the dead leaves round about hold little handfuls of half-thawed and re-frozen snow.

It is a thing to which we are apt to give little thought, but it is true that the woods harbor many more kinds of evergreens down at the roots of the trees than can be counted among the pines and spruces and cedars. Of this lesser evergreen population the hepatica is one of the most frequently found specimens.

Its thickish hairy-stemmed foliage lasts over from one year into the next, and does not die and wither until well into the following summer.

It is easy in most cases, however, to distinguish between this spring's leaves and last summer's, not only by the smaller size of the new leaves but also by the purplish color of the old. It seems to be a case of autumn coloration without the shedding of the leaves.

Hepatica

This purplish tinge, combined with the three-lobed shape of the leaves, suggested small livers to the ancients, from which its name hepatica, which translates literally into the common English title, liver-leaf.

According to the ancient medical doctrine of "signatures," any plant or plant part that looked like an animal or animal organ was supposed to be good for the ailments of that organ. So the medical men of bygone days made brews and messes of this harmless and beautiful little plant for patients with liver ailments.

• Science News Letter, 79:224 April 8, 1961

Do You Know?

The United States uses nearly 40,000,000 tons of *paper* and paperboard a year.

French scientists are building a power plant using ocean tides for *power*.

A new pill box sounds an alarm when it is time for a patient's *medicine*.

Rust-resistance found only in the wild *oat* Saia has successfully been transferred to commercial oat varieties.

Scientific experiments indicate that too much light given *chickens* at too young an age reduces egg production.

The world's first high-power spiral ridge *cyclotron*, a new type atom smasher with more power in a smaller package, is now in operation.

Although fatal *accidents* among the United States farm population have decreased in the last decade, they still are responsible for about 11,700 deaths each year.

• Science News Letter, 79:224 April 8, 1961